



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,775	03/30/2005	Eva Marie Moser	05-207	2278

34704 7590 06/21/2006

BACHMAN & LAPOINTE, P.C.
900 CHAPEL STREET
SUITE 1201
NEW HAVEN, CT 06510

EXAMINER

ARENA, ANDREW OWENS

ART UNIT	PAPER NUMBER
----------	--------------

2811

DATE MAILED: 06/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/529,775	MOSER, EVA MARIE	
	Examiner	Art Unit	
	Andrew O. Arena	2811	

– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 May 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 10-12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 13 and 14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 March 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of claims 1-9, 13, and 14 in the reply filed on 05/15/2006 is acknowledged.

Drawings

Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old (specification ¶36 ln 2-3) is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Composite material comprising titanium dioxide layer on titanium suboxide layer on substrate.

The specification is objected to because of the following informalities: the recitation " $0.7 \leq x < 0.2$ " (§37 ln 2) seems to be a misprint of " $0.7 \leq x < 2$ " (see specification ¶6 ln 2, ¶10 ln 3, ¶19 ln 4, ¶20 ln 4, ¶26 ln 1-2).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3, 4, 5, 6, 9, 13, and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131

USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance:

claim 3 recites the broad statement "thickness of 10 to 200 nm" and also recites "preferably 20 to 150 nm", which is the narrower statement of the range;

claim 4 recites the broad statement "a protective layer" (no limitation on thickness) and also recites "preferably with maximum the same layer thickness as...", which is the narrower statement of the limitation;

claim 6 recites the broad statement "an electrically conductive...layer" (no limitation on material) and also recites "preferably comprises TiO_x ...", which is the narrower statement of the limitation;

claim 8 recites the broad statement "a plastic substrate" and also recites "preferably mixed with the plastic substrate...are...filler particles", which is the narrower statement of the limitation.

Claim 4 recites a "polar adhesion layer" without specifying the structure of said layer. The metes and bounds of said recitation cannot be determined, rendering the claim indefinite.

Claim 5 recites "the total proportion of all metal oxides remains below 50%", which contradicts the claimed structure being titanium oxide mixed "and/or" doped with additional metal oxides; since applicant has claimed a material in which the total proportion of all metal oxides is 100%.

Claims 13 and 14 provide for the use of a composite material, but, since the claims do not set forth any steps involved in the method/process, it is unclear what

method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 13 and 14 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See ex.: *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claim Objections

Claims 1, 2, 4, 5, and 6 are objected to because of the following informalities: each of these claims sets forth a plurality of elements or steps, and each element or step of the claim should be separated by a line indentation. See MPEP § 608.01(m).

Claims 1, 4 and 5 are objected to because of the following informalities: the recitation "and/or" is not the proper Markush style of claiming. See MPEP § 803.02. In the present case:

In claim 1, the use of "and/or" is confusing as to whether a "crystalline" layer is required: in addition to the amorphous layer; or as an alternative to the amorphous layer.

In claim 4, the use of "and/or" is confusing as to whether a "polar adhesion layer" is required: in addition to the metal oxides; or as an alternative to the metal oxides.

In claim 5, the first and third instances of "and/or" should be changed simply to "and" since SiO_2 is part of the first Markush group of metal oxides and CaO is part of the second Markush group of metal oxides. The Markush groups (see Ins 4, 6, and 9) should be explicitly labeled as "first" and "second" when initially defined. The second instance of "and/or" is confusing as to whether the claimed doping is required: in addition to the claimed mixing; or as an alternative to mixing.

For claims 4 and 5, examiner suggests either: one claim reciting the first limitation (metal oxides or mixing) and a claim depending therefrom which adds the second limitation (polar adhesion layer or doping); or two alternate claims, one reciting the first limitation (metal oxides or mixing) and a second reciting the other limitation (polar adhesion or doping).

Claim 5 is objected to because of the following informalities: the recitation "at least one metal" (In 3) seems to be an error and should be replaced with "at least one metal oxide" (see claim 4 In 5).

Appropriate correction of claims 1, 2, 4, 5, and 6 is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Nishiyama (US 6,326,670).

Regarding claim 1, Nishiyama discloses (Fig 32) composite material of a substrate (10; col 2 ln 59) with,

applied to at least one side, a titanium oxide layer (31+32; col 12 ln 66) with a chemical, physical, mechanical, catalytic, and/or optical function (gate insulating; col 12 ln 67), characterized in that

on the substrate is deposited a titanium oxide layer of a base layer (31) of TiO_x (col 13 ln 1) with an oxygen content of $0.7 \leq x < 2$ (col 13 ln 2) and

on this base layer is applied a top layer (32) of amorphous and/or crystalline TiO_2 (col 13 ln 4).

Regarding claim 2, Nishiyama discloses the titanium oxide layer (31+32) has a total layer thickness of 3 to 1000 nm (30 nm; col 12 ln 66 – col 13 ln 1), where the top layer (32) comprises at least around 10% of the total layer (about 50%; Fig 32).

Regarding claim 3, Nishiyama discloses the titanium oxide layer (31+32) has a total layer thickness of 10 to 200 nm, preferably 20 to 150 nm (30 nm; col 13 ln 1).

Claims 1, 2, 6, 8, 9, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Tatsumi (US 2002/0008914)

Regarding claim 1, Tatsumi discloses (Fig 1) composite material of a substrate (10; ¶30 ln 3) with,

applied to at least one side, a titanium oxide layer (11-14; additional layers included, consistent with applicant's Fig 5, claims 4 and 6, spec ¶16, ¶15) with a chemical, physical, mechanical, catalytic, and/or optical function (mirror; ¶30 ln 2), characterized in that

on the substrate is deposited a titanium oxide layer of a base layer (11) of TiO_x (¶31 ln 1) with an oxygen content of $0.7 \leq x < 2$ (¶31 ln 3) and

on this base layer is applied a top layer (14) of amorphous and/or crystalline TiO_2 (¶35 ln 1).

Regarding claim 2, Tatsumi discloses the titanium oxide layer (11-14) has a total layer thickness of 3 to 1000 nm ($475\text{nm} = 125+150+100+100 = 475\text{nm}$; ¶38 lns 10, 12, 16, 20; $100\text{nm} \leq \lambda/4 < 175\text{nm}$; ¶39 ln 5), where the top layer (14) comprises at least around 10% of the total layer ($100\text{nm}/475\text{nm}$ is at least 10%).

Regarding claim 6, Tatsumi discloses that between the base layer (11) and the top layer (14) of the titanium oxide layer (11-14) is deposited an electrically conductive intermediate layer (12; ¶32 ln 1). [In view of the indefiniteness explained above, the limitations following the recitation "preferably" are regarded as merely exemplary.]

Regarding claim 8, Tatsumi discloses (Fig 1) a plastic substrate (10; ¶30 In 5).

[In view of the indefiniteness explained above, the limitations following the recitation “preferably” are regarded as merely exemplary.]

Regarding claim 9, Tatsumi discloses (Fig 1) a flammable (plastic) substrate (10; ¶30 In 5) characterized in that the TiO_x base layer (11) of the titanium oxide layer (11-14) has an oxygen content of $1.5 \leq x < 1.9$ (¶31 In 3).

Regarding claim 13, Tatsumi discloses (Fig 1) use of a composite material with a plastic substrate (10; ¶30 In 5) to increase the thermal stability and flame inhibition of polymer materials (since Tatsumi identically discloses applicant's claimed invention, the material of Tatsumi is inherently capable of being put to applicant's claimed use).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 4, 5, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cuomo (US 2002/0172938) in view of Nishiyama (US 6,326,670).

Regarding claim 1, Cuomo discloses composite material (¶11 In 1-2, ¶12 In 1) of a substrate (lowermost of the plurality of base layers: ¶12 In 1) with,

applied to at least one side, a titanium oxide layer (§12 ln 12; MO: §11 ln 7, ln 10) with a chemical, physical, mechanical, catalytic, and/or optical function (non-adsorbing; §16 ln 6), characterized in that

on the substrate is deposited a titanium oxide layer of a base layer (§12 ln 1) of TiO_x (§12 ln 12) with an oxygen content, and

on this base layer is applied a top layer (coating: MO, §11 ln 10) of amorphous and/or crystalline titanium oxide (§11 ln 7).

Further regarding claim 1, Cuomo differs from the claimed invention only in not expressly disclosing the oxygen content of the titanium oxide base layer, and in not expressly disclosing the titanium oxide top layer is TiO_2 .

Nishiyama discloses (Fig 32) a $\text{TiO}_x/\text{TiO}_2$ stack (col 12 ln 66) wherein a base layer of TiO_x has an oxygen content of $0.7 \leq x < 2$ (col 13 ln 2) and a top layer of titanium oxide is TiO_2 (col 13 ln 4).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made that in the composite material of Cuomo, a base layer of TiO_x has an oxygen content of $0.7 \leq x < 2$ and a top layer of amorphous and/or crystalline TiO_2 ; at least so oxygen in the TiO_x films is inactivated (Nishiyama: col 13 ln 6-10).

Regarding claim 4, Cuomo discloses that between the substrate and the base layer of the titanium oxide layer is deposited a protective layer of a metal oxide of ZnO (zinc oxide; §26 ln 7).

Regarding claim 5, Cuomo discloses the base layer of TiO_x is mixed (§12 ln 14) with a metal oxide of ZnO (§12 ln 14).

Cuomo differs from the claimed invention in not expressly disclosing the mixing ration.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made that the total proportion of all [additionally mixed] metal oxides remains below 50%; at least so the titanium oxide layer remains mostly titanium oxide.

Regarding claim 14, Cuomo discloses use of a composite material as active hygiene protection (§16 In 4-6; Cuomo is inherently capable of being put into applicant's claimed uses).

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cuomo and Nishiyama as applied to claim 1 above, and further in view of Fujimori (US 2002/0108649).

Regarding claim 7, Cuomo differs from the claimed invention only in not expressly disclosing the TiO₂ modification anatase.

Fujimori discloses the TiO₂ modification anatase has a higher electron transport efficiency ([0090]).

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify Cuomo in view of Fujimori such that at least the nine top atomic layers of the top layer of the titanium oxide layer mainly comprise the TiO₂ modification anatase; at least for higher electron transport efficiency.

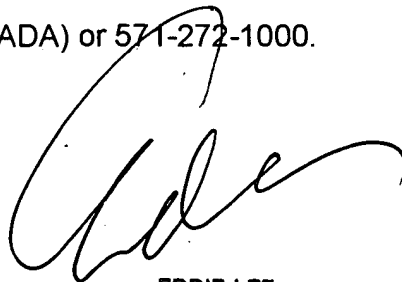
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew O. Arena whose telephone number is (571) 272-5976. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AOA
9 June 2006



EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800